

EXAM 2
Stat 201
March 23, 2009

Name _____

1. For a population of teenage boys, the mean sub-scapular skinfold thickness (in millimeters) is 9.6 and the standard deviation is 6.0. For a simple random sample of size 70 drawn from this population what is the probability that the sample mean will be between 8.5 and 11.75? (5 pts)

2. Thirty-eight experimental rabbits with vitamin C deficiency were divided equally into two groups. Group 1 received treatment consisting of a diet that provided vitamin C. The second group was not treated. At the end of the experimental period, serum calcium determinations were made with the following results:

Treated group: $\bar{x} = 10.1$ mg/100 ml, $s = 1.4$

Untreated group: $\bar{x} = 5.8$ mg/100 ml, $s = 2.1$

Assuming normally distributed populations with equal variance find a 99% confidence interval for the difference between the population means. Use the 99% interval to draw a conclusion as to whether or not there actually is a difference in the *population* means. (Clearly, the sample means are different.) (7 pts)

3. Following a week-long hospital supervisory training program, 36 assistant hospital administrators made a mean score of 72 on a test administered as a part of the evaluation of the training program. The sample standard deviation was a 10. Can it be concluded that the population variance is probably greater than 12?

(a) State any assumptions you would need to make in order to answer the question. (3 pts)

(b) Calculate a 99% Confidence interval for the population variance. Does this interval support the conclusion that $\sigma^2 \geq 12$ or does it indicate that the conclusion is probably false? (10 pts)

4. A sample of eight patients admitted to a hospital with a diagnosis of biliary cirrhosis had a mean IgM level of 160.55 units per milliliter. The sample standard deviation was 50. What is the probability that the true population mean is more than 165? (7 pts)

5. Noting the paucity of information on the effect of estrogen on platelet membrane fatty acid composition, Ranganath et al. conducted a study to examine the possibility that changes may be present in post-menopausal women and that these may be reversible with estrogen treatment. The 31 women recruited for the study had not menstruated for at least 3 months and/or had symptoms of the menopause. Now woman was on any form of hormone replacement therapy (HRT) at the time she was recruited. The following are the platelet membrane linoleic acid values before and after a period of (HRT):

Before	After
6.06	5.34
6.68	6.11
5.22	5.79
5.79	5.97
6.26	5.93
6.41	6.73
4.23	4.39
4.61	4.20
6.79	5.97
6.16	6.00
6.41	5.35
7.65	5.55
4.57	4.25
5.97	5.66
6.07	5.66
6.32	5.97
6.12	6.52
6.05	5.70
6.31	3.58
4.44	4.52
5.51	4.93
8.48	8.80
5.04	4.74
7.89	7.48
7.98	6.24
6.35	5.66
4.85	4.26
6.94	5.15
6.54	5.30
4.83	5.58
4.71	4.10

What (if any) conclusions can you draw about the effect of this treatment on the standard deviations of linoleic acid values of the population? Could you conclude that they might be the same? (Make a confidence interval [you choose α] for the ratio of the variances. (8 pts)